Biogeosciences
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Interactive comment on "Modelling Nitrification Inhibitor Effects on N$_2$O Emissions after Fall and Spring-Applied Slurry by Reducing Nitrifier NH$_4^+$ Oxidation Rate" *by* Robert F. Grant et al.

Anonymous Referee #2

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The authors have modified the ecosystem model to simulate effects of nitrification inhibitors on N2O emissions. The subject is interesting and useful. However, there are several issues that need to be improved before it can be accepted. My detailed comments are listed below: 1. Ln 73-77 recent references for modelling of nitrification inhibitor should be included. For example, Y Li et al., 2020. Modelling nitrification inhibitor effects on emissions of nitrous oxide (N2O) in the UK, Science of The Total Environment, 709: 136156. 2. Original model seems too long although most of them are putted in Supplementary materials. This distracts from the modified parts and novelties. It would be better if this paper can focus more on the modified parts of nitrification inhibitor. I would like to use a subsection to describe briefly the original model, such

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as oxidation reduction reaction. On the other hand, Section 2.9 should include more details, such as some equations related to the modification of nitrification inhibitor. 3. For the site description, it is better to add a figure to show the location of specific fields. 4. Ln240, the Arrhenius equation of fTs could be given. 5. It is unclear what Fall and Spring in Fig. 2 are since Fig. 2 (a)-(d) were in 2014-2016. 6. It may not be sufficient to examine the sensitivity of one parameter, KiNH4 (Table 9) because other parameters should be important, such as RI, K_CO2 and temperature coefficients in fTs. 7. What is ftl in Eq. (3)? 8. Other factors, such as soil moisture and pH, can also affect N2O emission with the nitrification inhibitor. The limitations should be discussed due to the neglection of these factors.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2019-281, 2019.